COAL ASH IMPOUNDMENT SITE ASSESSMENT FINAL REPORT

SUBMITTED TO:

MONTROSE GENERATING STATION
KCP&L Greater Missouri Operations Company
MONTROSE, MISSOURI

December 2011

KLEINFELDER

COAL ASH IMPOUNDMENT
SITE ASSESSMENT REPORT

Montrose Generating Station
Kansas City Power & Light
Montrose, Missouri

Prepared by:

611 Corporate Circle, Suite C
Golden, CO 80401

KLEINFELDER PROJECT NUMBER 116664-1

December 6, 2011

I acknowledge that the management units referenced herein:

- North Ash Pond
- South Ash Ponds

Were assessed on March 1, 2011

Signature: _____ Date: 12-6-11

Jeffrey G. Hoffman, P.E.
Lead Geotechnical Engineer

STATE OF MISSOURI
JEFFREY G. HOFFMAN
NUMBER
PE-2005029616
12-6-11
PROFESSIONAL ENGINEER

Copyright 2011 Kleinfelder West, Inc.

Background information taken from the U. S. Environmental Protection Agency's (EPA's) website:

> "Following the December 22, 2008 dike failure at the TVA/Kingston, Tennessee coal combustion waste (CCW) ash pond dredging cell that resulted in a spill of over 1 billion gallons of coal ash slurry, covered more than 300 acres and impacted residences and infrastructure, the EPA is embarking on an initiative to prevent the catastrophic failure from occurring at other such facilities located at electric utilities in an effort to protect lives and property from the consequences of a impoundment or impoundment failure of the improper release of impounded slurry."

As part of the EPA's effort to protect lives and the environment from a disaster similar to that experienced in 2008, Kleinfelder was contracted to perform a site assessment at the Montrose Generating Station that is owned and operated by Kansas City Power & Light (KCP&L). This report summarizes the observations and findings of the site assessment that occurred on March 1, 2011.

The coal combustion waste impoundments observed during the site assessment included:

- North Ash Pond – Commissioned approximately in 1958
- South Ash Pond – Commissioned approximately in 1958

The Response Letter to the EPA's Section 104(e) Request for information is presented in Appendix B. This letter addresses one unit "Ash Settling Pond." However, after review of the site conditions, the assessment was conducted on the aforementioned two ash ponds. Although an impoundment height of six feet was indicated on the Request for Information, the two ash ponds observed were both incised ponds with a depth of approximately six feet when empty.

Preliminary observations made during the site assessment are documented on the Site Assessment Checklists presented in Appendix A. A copy of these checklists was transmitted to the EPA following the field walk-through. A more detailed discussion of the observations is presented in Section 4, "Site Observations."

The North Ash Pond and South Ash Pond impoundments are not regulated by any state agency and therefore do not currently have a designated hazard rating. Failure at either of these impoundments would likely be contained on KCP&L property and there is no probable loss of human life or economic losses. Any environmental losses would be

Copyright 2011 Kleinfelder West, Inc.

anticipated to be very low. As such, it is recommended that a Hazard Classification of "Less than Low" be assigned to both impoundments.

Overall, the site is reasonably well maintained and operated with few areas of concern as discussed in Section 6, "Recommendations."

On the date of this site assessment, there appeared to be no immediate threat to the safety of the impoundment embankments. No assurance can be made regarding the impoundments condition after this date. Subsequent adverse weather and other factors may affect the condition.

A brief summary of the Priority 1 and 2 Recommendations is given below. A more detailed discussion is provided in Section 6, "Recommendations."

Priority 1 Recommendations

1. None.

Priority 2 Recommendations

1. Prepare an Emergency Action Plan (EAP) for the facility.

2. Repair erosion on impoundment slopes and drainage ditch.

3. Perform vegetation mitigation around impoundment structures and incised slopes.

4. Perform an elevation survey.

Copyright 2011 Kleinfelder West, Inc.

Table of Contents

EXECUTIVE SUMMARY **2**

SECTION 1 – INTRODUCTION **7**
1.1 General 7
1.2 Project Location 7
1.3 Site Documentation 7

SECTION 2 – SITE ASSESSMENT **9**
2.1 Attendees 9
2.2 Impoundments Inspected 9
2.3 Weather During Assessment 9

SECTION 3 – SITE INFORMATION AND HISTORY **10**
3.1 Site Information and History 10
3.2 Pertinent Data 10
3.3 Regional Geology and Seismicity 12
3.4 Hydrology and Hydraulics 13
3.5 Geotechnical Considerations 14
3.6 Structural Considerations 14
3.7 Performance Evaluations 15
3.8 Hazard Classification 15
3.9 Site Access 15

SECTION 4 – SITE OBSERVATIONS **16**
4.1 South Ash Pond 16
4.1.1 Incised Slope 16
4.1.2 Crest 16
4.1.3 Decant Pipes 16
4.1.4 Outlet Works 17
4.1.5 Impoundment Inlet 17
4.2 North Ash Pond 17
4.2.1 Incised Slope 17
4.2.2 Crest 17
4.2.3 Outlet Works 18
4.2.4 Drainage Ditch 18
4.2.5 Impoundment Inlet 18

SECTION 5 – OVERALL CONDITION OF THE FACILITY IMPOUNDMENTS **41**
5.1 Analysis and Conclusions 41
5.2 Summary Statement 42

SECTION 6 – RECOMMENDATIONS **43**
6.1 Priority 1 Recommendations 43
6.2 Priority 2 Recommendations 43
6.3 Definitions 44

SECTION 7 – GLOSSARY OF TERMS **45**

SECTION 8 – LIMITATIONS **48**

SECTION 9 – REFERENCES **49**

Copyright 2011 Kleinfelder West, Inc.

List of Photographs

1 - Sluice Pipes to Ash Ponds Looking Northwest……19
2 - 12” and 18” Pipes to Ash Ponds ……19
3 - Inlet Pipe to North and South Ponds ……20
4 - South Pond Inlet Channel Looking South ……20
5 - East Side of South Pond Looking West ……21
6 - “Employee Fishing Area” Adjacent to Discharge Canal ……21
7 - Embankment Adjacent to Inlet Channel Looking East ……22
8 - Primary South Pond Looking Northeast ……22
9 - Primary South Pond Looking East ……23
10 - Primary South Pond Looking Northwest ……23
11 - Inlet to East Decant Pipe ……24
12 - Approximate Location of Inlet to West Decant Pipe ……24
13 - Outlet to West Decant Pipe ……25
14 - Outlet to East Decant Pipe ……25
15 - Erosion on West End of South Pond Looking South ……26
16 - South Pond Decant Outlet Looking North (West Pipe Not Visible)……26
17 - Soil and Ash Obstruction in Secondary South Pond ……27
18 - Erosion on Land Side of Embankment near Discharge Canal……27
19 - South Pond Intake to Outfall……28
20 - Secondary South Pond Looking West ……28
21 - Outlet of South Pond Outfall ……29
22 - Inlet Area of North Pond Looking Southeast……29
23 - Erosion on West Bank of North Pond ……30
24 - North Pond Looking Southeast ……30
25 - Inlet to North Pond Outfall ……31
26 - Inlet to South Pond Outfall ……31
27 - Outlet of North Pond Outfall ……32
28 - South Pond Outfall Discharge Area and Ditch ……32
29 - North Pond North Embankment Looking East ……33
30 - North Pond Drainage Ditch Looking Downstream ……33
31 - First Drainage Ditch Culvert Inlet (Replaced in 2010)……34
32 - First Drainage Ditch Culvert Outlet (Replaced in 2010)……34
33 - Second Drainage Ditch Culvert Inlet ……35
34 - Drainage Ditch Culvert Looking Upstream ……35
35 - Drainage Ditch from North Pond looking North, Upstream ……36
36 - Drainage Ditch from North Pond Flowing to Discharge Canal ……36
37 - Piezometer Not Used for Ash Ponds ……37
38 - Piezometer with Elevation Marker ……37
39 - Metal Washing Discharge Pond ……38
40 - Bottom Ash and Fly Ash Silos Looking West ……38
41 - Bottom Ash Silo Looking West……39
42 - Bottom Ash Silo Looking North ……39
43 - Bottom Ash Silo Filling Truck ……40
44 - LaFarge Fly Ash Haul Truck ……40

Copyright 2011 Kleinfelder West, Inc.

List of Plates

Plate 1	Downstream Infrastructure Map
Plate 2	KCP&L Property Map
Plate 3	Aerial Site Location Map
Plate 4	Pond Area - Site Features Map
Plate 5	Pond Area - Photograph Location Map

List of Appendices

Appendix A	Site Assessment Checklists
Appendix B	Response Letter to the EPA's Section 104(e) Request for Information

Copyright 2011 Kleinfelder West, Inc.

SECTION 1 – INTRODUCTION

1.1 General

This report has been prepared for the United States Environmental Protection Agency (EPA) to document findings and observations from a site assessment at the Montrose Generating Station on March 1, 2011.

The following sections present a summary of data collection activities, site information, performance history of the facility's impoundments, and a summary of site observations and recommendations resulting from the site assessment.

1.2 Project Location

The Montrose Generating Station is located on the north bank of Montrose Lake in Henry County, Missouri. The station is located approximately 4.5 miles northeast of the Town of Montrose, Missouri at Latitude 38° 18' 40'' N and Longitude 93° 56' 05'' W, as shown in Plate 1. The Montrose Generating Station property line is shown on Plate 2.

1.3 Site Documentation

Kansas City Power & Light (KCP&L) provided the following documents during the time of this inspection to aid in the review of the impoundments:

- KCP&L Montrose Generating Station Ash Settling Ponds, Available Information Checklist, Coal Combustion Waste Impoundment (CCWI) Dam, March 1, 2011.
- Request for Information under Section 104(e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9604(e), May 15, 2009.
- Missouri State Operating Permit # MO-0101117, June 5, 2009.
- Montrose Generation Station SPCC Plan, Plant Layout and Outfall, Figure F-02, July 3, 2007
- Montrose Generating Station, Coal Combustion Product Storage Ponds, Operation and Maintenance Plan, February 18, 2011
- Montrose CCB Pond Freeboard Checklist, February 23, 2011
- Montrose CCB Pond Inspection Checklist, February 23, 2011

Copyright 2011 Kleinfelder West, Inc.

- Montrose Solid Waste Disposal Area Containment Facility Map, Sheet D33, April 13, 1967.

- Environmental Protection Agency, Steam Electric Questionnaire, Part D – Pond/Impoundment Systems and other Wastewater Treatment Operations.

All documents were provided in a compact disc (CD) titled Montrose Generating Station Pond Assessment, dated March 1, 2011.

Copyright 2011 Kleinfelder West, Inc.

SECTION 2 – SITE ASSESSMENT

2.1 Attendees

The site assessment was performed on March 1, 2011 by Jeff Hoffman, P.E. and Brad Piede, E.I.T. of Kleinfelder. Other persons present during the site assessment included:

- Paul Ling – KCP&L
- Greg Lee – KCP&L
- Robert Hollinsworth, PE – KCP&L
- David Kelsay – KCP&L
- Kim Daugherty – KCP&L
- Mark Adams – KCP&L

2.2 Impoundments Inspected

Impoundments and associated structures that were observed during the site assessment included:

- North Ash Pond – Commissioned approximately in 1958
- North Ash Pond Outfall
- North Ash Pond Drainage Ditch
- South Ash Pond – Commissioned approximately in 1958
- South Ash Pond Connecting Pipes
- South Ash Pond Outfall
- North and South Ash Ponds Inlet

Observations from the site assessment are documented on the Site Assessment Checklists presented in Appendix A. A summary of observations from the site assessment is presented in Section 4.

2.3 Weather During Assessment

During the assessment of the Montrose Generating Station impoundments, the weather was mostly sunny and temperatures ranged from 55° to 60° F. Wind speed ranged from 10 to 20 miles per hour (mph).

Copyright 2011 Kleinfelder West, Inc.

SECTION 3 – SITE INFORMATION AND HISTORY

3.1 Site Information and History

The Montrose Generating Station is a coal-fired power generating facility. The facility currently sluices bottom ash, a small amount of fly ash and other materials into the Ash Ponds. The Ash Ponds are alternated into service to allow for maintenance and dredging of waste material from the out-of-service pond. The South Ash Pond is the primary facility used for about 9 months of the year. When dredging and maintenance is required, a temporary berm is constructed to divert water to the North Pond. Water from the South Ash Pond flows directly to the Discharge Canal south of the ash pond, but water from the North Ash Pond flows through north and east of the ash ponds in a drainage ditch to the Discharge Canal. The Discharge Canal flows into Montrose Lake, which is on-site and owned by KCP&L. An aerial image of these impoundments can be seen in Plates 3 and 4.

The South Ash Pond is an incised earthen impoundment in natural ground that was not built over wet ash, slag, or other unsuitable materials, and consists of two pools connected by twin 24-inch corrugated metal pipes (CMP). Sluice pipes, transporting primarily bottom ash with some fly ash from power generating operations, discharge into the east side of the initial pond. From the pond inlet, the ash slurry flows in a narrow channel through a buildup of ash toward the west side of the pond. Water decants through twin 24-inch pipes into the west side of the secondary pond. Water flows east to a 4-foot box culvert outfall where it flows to the Discharge Canal. The minimum operating water surface elevation (invert of twin decant pipes) of the South Pond was not available.

The North Ash Pond is also an incised earthen impoundment in natural ground, and was not built over wet ash, slag, or other unsuitable materials. A temporary berm is constructed at the common inlet to direct all flows to the North Pond while the South Pond is maintained and dredged. From the pond inlet, the ash slurry flows toward the west side of the pond. Water decants through a 24-inch Reinforced Concrete Pipe (RCP) to a drainage ditch where it gravity drains to the Discharge Canal. The minimum operating water surface elevation (invert of RCP outfall) of the North Pond was not available.

3.2 Pertinent Data

Data listed below was primarily gathered from information provided by KCP&L at the time of the site visit. As-built drawings and design documentation was not available at the time of inspection. Data not provided by KCP&L was estimated as noted below.

Copyright 2011 Kleinfelder West, Inc.

A. GENERAL

1. Name ..... Montrose Generating Station
2. State ..... Missouri
3. County ..... Henry
4. Latitude ..... 38° 18' 40" North
5. Longitude ..... 93° 56' 05" West
6. River used for operations ..... Montrose Lake
7. Year Constructed 1958
8. Modifications ..... None
9. Current Hazard Classification ..... None

B. IMPOUNDMENTS

SOUTH ASH POND

1. Type ..... Earthen – Incised
2. Pond Capacity ..... 16.2 acre-feet[1,5]
3. Crest Elevation ..... 756± feet[1]
4. Crest Length ..... Approx. 2,100 feet[2]
5. Crest Width ..... Native ground[3]
6. Impoundment Height ..... Approx. 6 feet waterside incised depth[1]
7. Upstream Slope ..... Variable
8. Downstream Slope ..... Variable
9. Total Solids ..... 4900 tons[1]

NORTH ASH POND

1. Type ..... Earthen – Incised
2. Pond Capacity ..... 9.9 acre-feet[1,5]
3. Crest Elevation ..... 758± feet[1]
4. Crest Length ..... Approx. 1,700 feet[2]
5. Crest Width ..... Native ground[3]
6. Impoundment Height ..... Approx. 6 feet waterside incised height[1]
7. Upstream Slope ..... Variable
8. Downstream Slope ..... Variable
9. Total Solids ..... 4900 tons[1]

C. DRAINAGE BASIN

1. Area of Drainage Basin ..... Unknown
2. Downstream Description: ..... Montrose Lake

D. POND INLET

NORTH AND SOUTH ASH POND

1. Pond Inlet ..... Sluice pipes from the generating station[4]

E. PRIMARY SPILLWAY

SOUTH ASH POND

1. Description ..... N/A – No Spillway Present

NORTH ASH POND

1. Description ..... N/A – No Spillway Present

Copyright 2011 Kleinfelder West, Inc.

F. OUTLET WORKS

SOUTH ASH POND

1. Description ..... 4 feet by 4 feet box culvert
2. Location ..... Near southeast corner of the pond
3. Intake Structure ..... CMP
   a. Intake Invert Elevation ..... Unknown[7]
4. Discharge Conduit ..... Box culvert of unknown material[6,7]
   a. Length ..... approximately 45 feet
   b. Diameter ..... Unknown[6,7]
5. Decant Conduits ..... Uncontrolled dual 24-inch CMP
   a. Decant Invert Elevation ..... Unknown[7]
   b. Energy Dissipation ..... Unknown[7]
6. Outlet Structure ..... Uncontrolled gravity discharge
   a. Outlet Invert Elevation ..... Unknown[6,7]
   b. Energy Dissipation ..... Unknown[6,7]
7. Discharge Capacity with Water Surface at Top of Impoundment ..... Unknown

NORTH ASH POND

1. Description ..... 24-inch RCP
2. Location ..... Near northwest corner of the pond
3. Intake Structure ..... Uncontrolled 24-inch RCP
   a. Intake Invert Elevation ..... Unknown[7]
4. Discharge Conduit ..... 24-inch RCP
   a. Length ..... approximately 70 feet[2]
   b. Diameter ..... 24 inches
5. Outlet Structure ..... Uncontrolled gravity discharge
   a. Outlet Invert Elevation ..... Unknown[7]
   b. Energy Dissipation ..... Natural channel bottom
6. Discharge Channel ..... Unlined, incised channel about 10-15 feet wide
7. Discharge Capacity with Water Surface at Top of Impoundment ..... Unknown

G. MANAGEMENT

1. Owner ..... Kansas City Power & Light
2. Purpose ..... Coal Fired Energy Generation

Notes:
1. Referenced from documentation provided by KCP&L.
2. Information approximated using Google Earth.
3. Ash Ponds are incised and do not have a defined crest.
4. Both ponds use a common inlet with flow directed to either pond by constructing a temporary berm.
5. Approximate calculation based on multiplying Maximum Embankment height by pond surface area.
6. Structure was inundated during the time of inspection and was not able to be inspected
7. No survey data was available at the time of inspection.

3.3 Regional Geology and Seismicity

The plant site is situated in the physiographic area called the Osage Plains Proper subregion of the Osage Plains, which is part of the larger Central Lowland province.

Copyright 2011 Kleinfelder West, Inc.

The Osage Plains is the southernmost of three tallgrass prairie physiographic areas, and is the transitional area between prairie and woodland.

The Web Soil Survey (http://websoilsruvey.nrcs.usda.gov) developed by the United States Department of Agriculture (USDA) and Natural Resources Conservation Service (NRCS) was reviewed for the area near the project. The Hartwell soil series is located in the area of the Montrose Generating Station. This soil series was derived of wind-blown loess underlain by residual clay derived from weathering processes acting on parent shale bedrock. The underlying geologic units are the Paleozoic Age, Pennsylvanian System, Atokan Series. Based on published information (www.cares.missouri.edu, March 15, 2011), the bedrock formations are likely either the Burgner or Riverton formations. The Burgner formation consists of two coal beds overlain by siltstone, which in turn is overlain by limestone. The Riverton formation is composed of dark gray to black shale with as many as three coal beds.

United States Geological Society (USGS) has developed and mapped peak ground accelerations (PGA) having a 2% probability of exceedance in 50 years. Based on Kleinfelder's experience near the plant site and published information, we have assumed a Seismic Site Class "C" with a PGA at the plant site of 0.07 g. This value could vary depending on a site classification defined by a subsurface exploration.

The presence of existing known faults was also evaluated by reviewing posted geologic information on University of Missouri, Center for Applied Research and Environmental Systems (CARES) website (www.cares.missouri.edu). Based on the published information, closest known fault is approximately 24 miles east of the plant site.

3.4 Hydrology and Hydraulics

The North and South Ash Ponds were constructed by excavating pits in the natural ground to the North of Montrose Lake. The exact extents of the drainage area for the Primary Ash Pond cannot be determined without an updated survey of the impoundments, plant footprint, and surrounding areas, as well as storm sewer plans.

Kleinfelder was not provided with documents for review relating to hydrologic studies and hydraulic design calculations/assumptions. As a result, the designed inflow, capacity of the ponds, design freeboard, and outlet works capacity is unknown at this time.

The South Ash Pond has an approximate surface area of 2.7 acres and a maximum storage capacity of approximately 16.2 acre-feet. The pond consists of a primary settling pond that decants through twin 24-inch CMPs to a secondary settling pond. The Secondary South Pond uses a 4-foot box outfall to discharge flows to the Discharge Canal. The decant pipes and box outfall minimum operating water

Copyright 2011 Kleinfelder West, Inc.

surface elevations were not available. The box outfall outlet was submerged and not visible.

The North Ash Pond has an approximate surface area of 1.7 acres and a maximum storage capacity of approximately 9.9 acre-feet. The North Ash Pond is equipped with two uncontrolled 24-inch RCPs that discharge to a drainage ditch. The drainage ditch flows under two haul roads through 36-inch RCPs. The RCP outfall minimum operating water surface elevation was not available. The North Ash Pond was not in service and contained mostly rain and run-off water at the time of our site visit. A small discharge was observed flowing through the outfall into the drainage ditch.

3.5 Geotechnical Considerations

The Ash Pond facilities are incised ponds constructed by excavation of the natural ground; however, adjacent incised features create effective embankments in some sections of the ponds perimeter. Owner documentation shows “in-situ clay” was used to line the ponds. The incised pond slopes varied from steep to gentle and ranged from 1-4 feet tall during inspection. Tall grass vegetation covered most of the embankment except for the haul roads to the North and South of the facilities. Incised embankment design documentation or slope stability analysis was not available. Although the ponds are incised, the potential exists for the embankments formed between the incised ponds and incised drainage channels to fail and cause an uncontrolled release in the adjacent KCP&L owned Montrose Lake. This slope failures scenario would likely only impact plant operations.

No historical seepage has been reported and none was observed at the time of inspection due to the absence of a landside slope. One Piezometer is located on-site to the South of the South Pond shown in Photographs 29 and 30; however, it is Kleinfelder’s understanding that this is used to monitor other operations.

3.6 Structural Considerations

The structural components within the Montrose Generating Station impoundments include corrugated metal pipes (CMPs); reinforced concrete pipes (RCPs), and a box culvert outfall.

The South Pond has twin 24-inch decant CMPs connecting the primary and secondary settling ponds. Based on external visual inspection, the east pipe appeared to be in good condition with minor corrosion. Flow can be seen passing through the pipe; however, internal condition could not be verified. The west pipe appears to be passing flow; however, excessive vegetation obstructed visual inspection of the pipe. The 4-foot box outfall structure was in service and submerged at the time of the inspection. Outfall material, foundation, and general condition were not observed.

Copyright 2011 Kleinfelder West, Inc.

The North Pond has twin 24-inch RCP outfall pipes. Based on external visual inspection the pipes appeared to be in fair condition with some concrete deterioration at the ends of each pipe. Flow was not seen passing through the pipes because the North pond was not in service at the time of inspection. The internal condition of the pipes could not be verified.

Documentation of the structural portions of the impoundments under seismic loading was not available for our review. The plant site is located in a zone of relatively low risk for damaging seismic activity. Evaluation of the structural components of the impoundments under applicable seismic loading conditions merits consideration at the Owner's discretion.

3.7 Performance Evaluations

There have been no previous federal or state assessments of the Montrose Generating Station's North Ash Pond or South Ash Pond. Currently, KCP&L's local plant personnel perform weekly assessments of available freeboard, and the condition of the impoundments and their associated structures. Based on observations by KCP&L in their weekly assessments and other documents and accounts, there have been no major incidents or releases involving the North Ash Pond or the South Ash Pond in the last ten years.

3.8 Hazard Classification

The Montrose Generating Station's two impoundments are not regulated by any state agency and therefore do not currently have a designated hazard rating. Potential environmental and economic impacts that a failure at either of these impoundments would present appears low because an unintended release would be contained on KCP&L property. Significant economic loss, environmental damage, or disruption of lifeline facilities is not expected in the event of a failure. A loss of life situation is not expected, because both impoundments sit immediately adjacent to the Montrose Lake without any homes, recreational facilities, businesses, roads, or other structures immediately downstream of the impoundments. It is recommended a Hazard Classification of "Less than Low" be assigned to both impoundments.

3.9 Site Access

We were required to seek permission from KCP&L to gain access to the plant site. After arriving at the site and meeting with representatives of KCP&L, we were escorted by facility personnel to assess the impoundments. The impoundments can be accessed by standard car or on foot during normal weather conditions via gravel-surfaced roadways on the Montrose Generating Station property.

Copyright 2011 Kleinfelder West, Inc.

The impoundment embankments, decant pipes, and outlet works (portions not inundated at the time of inspection) of both the North Ash Pond and South Ash Pond were observed during the March 1, 2011 site assessment. General observations of these features are presented below; more specific observations of the site and facilities are documented in the Site Assessment Checklists provided in Appendix A. Site observation photographs are shown at the end of this section, and a map showing photograph locations is shown on Plate 5.

4.1 South Ash Pond

4.1.1 Incised Slope

Overall, the incised slope was in satisfactory condition. Photographs 5, and 7 through 10 show typical conditions of the incised slope. Specific observations include:

- The incised slope was steep above the water surface, based on visual observations. Inspection occurred while pond was in service so incised embankment slope below the water surface was not observed.
- Tall grass and brush was observed on the incised slope. Vegetation likely improves stability of the slope; however, it obstructed visual inspection of the embankment, inlet, decant, and outlet pipes.
- No large diameter trees or animal burrows were observed in the embankment.

4.1.2 Crest

Overall, the crest of the impoundment was in satisfactory condition. Photograph 7 shows the typical condition of the crest. Specific observations include:

- Crest width was variable and usually resembled the natural grade.
- Most of the impoundment crest was a gravel road.
- Almost no grasses were observed on the crest.
- No major depressions or rutting were noted on the impoundment crest.

4.1.3 Decant Pipes

Excessive vegetation was observed around the pipe inlets and outlets. View of the west pipe inlet and outlet was not visible and not inspected. Flow appeared to be passing through both pipes; however internal condition of the pipes was not verified. The decant pipes are shown in Photographs 11 through 14, and 16.

A soil and ash obstruction was observed to impede the flow in the secondary pond after the decant pipes. The debris was about 3-4 inches above the

Copyright 2011 Kleinfelder West, Inc.

upstream water surface and depth of debris underwater was unknown, depending on the amount of sedimentation at the time of the inspection. The debris is shown in Photograph 17.

4.1.4 Outlet Works

The outlet works appeared to function properly and was passing water; however the structure and foundation was submerged and not visible. The steel cover to the outlet works inlet was in satisfactory condition and showed minor corrosion. The outlet works can be seen in Photographs 19 and 21.

4.1.5 Impoundment Inlet

Inflow into the South Ash Pond includes metal pipes on the east side of the impoundment, as well as storm water runoff that flows naturally into the pond. The inlet channel showed some erosion of the bank. The inlet pipe appeared to be in satisfactory condition. The Inlet pipe can be seen in Photographs 3 and 4.

4.2 North Ash Pond

4.2.1 Incised Slope

Overall, the incised slope of the impoundment was in satisfactory condition. Photographs 22, 23, and 24 show the typical condition of the incised slope. Specific observations include:

- The incised slope was steep above the water surface, based on visual observations. Inspection occurred while the pond contained stormwater so the incised embankment slope below the water surface was not observed.
- Tall grass and brush was observed on the incised slope. Vegetation likely improves stability of the slope; however, it obstructed visual inspection of the embankment, inlet, and outlet pipes.
- No large diameter trees or animal burrows were observed in the embankment.

4.2.2 Crest

Overall, the crest of the impoundment was in satisfactory condition. Photograph 29 shows the typical condition of the crest. Specific observations include:

- Crest width was variable and usually resembled the natural grade.
- Most of the impoundment crest was a gravel road.
- Almost no grasses were observed on the crest.
- No major depressions or rutting were noted on the impoundment crest.

Copyright 2011 Kleinfelder West, Inc.

4.2.3 Outlet Works

The outlet works of the North Ash Pond are shown in Photographs 25 through 28, and consist of twin 24-inch RCPs. Water from the outlet is discharged to a drainage ditch, which flows to Montrose Lake (see Photographs 36, 39, 41, 42 and 43).

- Overall, the outlet works system appeared as if it would function as intended at the time of inspection.
- No riprap or energy dissipation structure was observed.

4.2.4 Drainage Ditch

Overall, the incised drainage ditch was in satisfactory condition. The first culvert on the north side was recently replaced and some riprap protection was present (Photographs 31, and 32). The second culvert showed some erosion on the upstream side and a chain-link fence had fallen down (Photographs 33 and 34). No vegetation or channel armor was present on the south side of the channel (Photograph 39).

4.2.5 Impoundment Inlet

Inflow into the North Ash Pond is via the impoundment inlet described in Section 4.1.5. At the time of the site visit, a temporary berm was constructed to direct water from the inlet into the South Ash Pond, as the North Ash Pond was not in service to allow for dredging operations.

Copyright 2011 Kleinfelder West, Inc.

1-Sluice Pipes to Ash Ponds Looking Northwest

2-12” and 18” Pipes to Ash Ponds

Copyright 2011 Kleinfelder West, Inc.

3-Inlet Pipe to North and South Ponds

4-South Pond Inlet Channel Looking South

Copyright 2011 Kleinfelder West, Inc.

5-East Side of South Pond Looking West

6-“Employee Fishing Area” Adjacent to Discharge Canal

Copyright 2011 Kleinfelder West, Inc.

7-Embankment Adjacent to Inlet Channel Looking East

8-Primary South Pond Looking Northeast

Copyright 2011 Kleinfelder West, Inc.

9-Primary South Pond Looking East

10-Primary South Pond Looking Northwest

Copyright 2011 Kleinfelder West, Inc.

11-Inlet to East Decant Pipe

12-Approximate Location of Inlet to West Decant Pipe

Copyright 2011 Kleinfelder West, Inc.

13-Outlet to West Decant Pipe

14-Outlet to East Decant Pipe

Copyright 2011 Kleinfelder West, Inc.

15-Erosion on West End of South Pond Looking South

16-South Pond Decant Outlet Looking North (West Pipe Not Visible)

Copyright 2011 Kleinfelder West, Inc.

17-Soil and Ash Obstruction in Secondary South Pond

18-Erosion on Land Side of Embankment near Discharge Canal

Copyright 2011 Kleinfelder West, Inc.

19-South Pond Intake to Outfall

20-Secondary South Pond Looking West

Copyright 2011 Kleinfelder West, Inc.

21-Outlet of South Pond Outfall

22-Inlet Area of North Pond Looking Southeast

Copyright 2011 Kleinfelder West, Inc.

23-Erosion on West Bank of North Pond

24-North Pond Looking Southeast

Copyright 2011 Kleinfelder West, Inc.

25-Inlet to North Pond Outfall

26-Inlet to South Pond Outfall

Copyright 2011 Kleinfelder West, Inc.

27-Outlet of North Pond Outfall

28-South Pond Outfall Discharge Area and Ditch

Copyright 2011 Kleinfelder West, Inc.

29-North Pond North Embankment Looking East

30-North Pond Drainage Ditch Looking Downstream

Copyright 2011 Kleinfelder West, Inc.

31-First Drainage Ditch Culvert Inlet (Replaced in 2010)

32-First Drainage Ditch Culvert Outlet (Replaced in 2010)

Copyright 2011 Kleinfelder West, Inc.

33-Second Drainage Ditch Culvert Inlet

34-Drainage Ditch Culvert Looking Upstream

Copyright 2011 Kleinfelder West, Inc.

35-Drainage Ditch from North Pond looking North, Upstream

36-Drainage Ditch from North Pond Flowing to Discharge Canal

Copyright 2011 Kleinfelder West, Inc.

37-Piezometer Not Used for Ash Ponds

38-Piezometer with Elevation Marker

Copyright 2011 Kleinfelder West, Inc.

39-Metal Washing Discharge Pond

40-Bottom Ash and Fly Ash Silos Looking West

Copyright 2011 Kleinfelder West, Inc.

41-Bottom Ash Silo Looking West

42-Bottom Ash Silo Looking North

Copyright 2011 Kleinfelder West, Inc.

43-Bottom Ash Silo Filling Truck

44-LaFarge Fly Ash Haul Truck

Copyright 2011 Kleinfelder West, Inc.

5.1 Analysis and Conclusions

Our analysis is summarized in three general considerations that are presented as follows:

Safety of the Impoundments, Including Maintenance and Methods of Operation

We understand that the impoundments have a history of safe performance. However, the future performance of these impoundments will depend on a variety of factors that may change over time, including surface water hydrology, changes in groundwater levels, changes in incised slope integrity, etc. In light of this situation, we have noted the following items that present some concern in this regard:

- An Emergency Action Plan (EAP) is not currently in place at the site to mitigate damage in the event of an emergency related to failure of the impoundment(s).
- Site survey of embankment and pipe invert elevations is not currently available for our review.

Changes in Design or Operation of the Impoundments Following Initial Construction

We are not aware of significant changes in the design or operation of the impoundments.

Adequacy of Program for Monitoring Performance of the Impoundments

The present monitoring program primarily involves visual inspections by plant personnel. These visual inspections seem to be adequate to address issues, such as surface erosion and general condition of the impoundments.

Copyright 2011 Kleinfelder West, Inc.

5.2 Summary Statement

I acknowledge that the management units referenced herein:

- North Ash Pond
- South Ash Ponds

Were personally inspected by me and found to be in the following condition:

SATISFACTORY

Signature: _____ Date: 12-6-11

Jeffrey G. Hoffman, P.E.
Lead Geotechnical Engineer

Copyright 2011 Kleinfelder West, Inc.

Based on observations during the site assessment, it is recommended that the following actions be taken at the Montrose Generating Station.

6.1 Priority 1 Recommendations

1. **None.** The impoundments appeared to be in satisfactory condition during inspection and no severe deficiencies were observed that would threaten the safety of the impoundment.

6.2 Priority 2 Recommendations

1. **Prepare an Emergency Action Plan (EAP) for the facility.** An EAP should be prepared for the North and South Ash Ponds, as well as any other pertinent features related to the impoundments. If weekly visual inspection indicates an uncontrolled release is imminent, a list of procedures and contacts should be available to KCP&L personnel to help mitigate damages.

2. **Repair erosion on impoundment slope and drainage ditch.** Areas where erosion has occurred should be filled in and re-dressed with appropriate fill to prevent erosion from cutting further into the impoundment slopes. Areas of concern include:
   - South Ash Pond inlet where higher velocity flows have eroded the impoundment slope and caused minor caving.
   - Drainage ditch slope near the southern culvert shows some erosion, which likely caused the adjacent chain-link fence to fall over.

3. **Perform vegetation mitigation around impoundment structures and incised slopes.** Refer to Federal Emergency Management Agency's (FEMA) Manual 534, "Impact of Plants on Earthen Impoundments" for guidance on vegetation removal. This manual is available on the FEMA website.

4. **Perform an elevation survey.** This survey should be performed to establish the embankment and pipe invert elevations. The survey datum should use the current standard which is North American Vertical Datum of 1988 (NAVD88). The survey data should be used to ensure adequate embankment height and hydrology of the ash pond facilities. The survey data will also assist with future maintenance, repair, and monitoring, as well as facilitate future inspection.

Copyright 2011 Kleinfelder West, Inc.

6.3 Definitions

Priority 1 Recommendation: Priority 1 Recommendations involve the correction of severe deficiencies where action is required to ensure the structural safety and operational integrity of a facility or that may threaten the safety of the impoundment.

Priority 2 Recommendation: Priority 2 Recommendations are where action is needed or required to prevent or reduce further damage or impaired operation of the facility and/or improve or enhance the O&M of the facility, that do not appear to threaten the safety of the impoundment.

Copyright 2011 Kleinfelder West, Inc.

For the EPA Ash Pond Assessment program, the following glossary of terms shall be used for classification unless otherwise noted.

Hazard Potential Rating

"Hazard Potential" means the possible adverse incremental consequences that result from the release of water or stored contents due to the failure of the impoundment or reservoir or the misoperation of the impoundment, reservoir, or appurtenances. The Hazard Potential Classification of an impoundment or reservoir shall not reflect in any way on the current condition of the impoundment or reservoir and its appurtenant works, including the impoundment's or reservoir's safety, structural integrity, or flood routing capacity. These classifications are as described below:

1. Less than Low Hazard Potential

"Less than Low Hazard" means failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

2. Low Hazard Potential

"Low Hazard" means an impoundment's or reservoir's failure will result in no probable loss of human life and low economic loss or environmental loss, or both. Economic losses are principally limited to the owner's property.

3. Significant Hazard Potential

"Significant Hazard" means a impoundment's or reservoir's failure will result in no probable loss of human life but can cause major economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns. Significant Hazard Potential classification impoundments or reservoirs are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

4. High Hazard Potential

"High Hazard" means a impoundment's or reservoir's failure will result in probable loss of human life.

Overall Classification of Impoundment

In a system similar to the New Jersey Department of Environmental Protection Impoundment Safety Guidelines for the Inspection of Existing Impoundments

Copyright 2011 Kleinfelder West, Inc.

(January 2008), when the following terms are capitalized, they denote and shall be used to describe the overall classification of the impoundment as follows:

SATISFACTORY - No existing or potential impoundment safety deficiencies are recognized. Acceptable performance is expected (the term expected is to be defined as likely) under all applicable loading conditions (static, hydrologic and seismic) in accordance with the applicable criteria. Minor maintenance items may be required.

FAIR – Acceptable performance is expected (the term expected is to be defined as likely) under all required loading conditions (static, hydrologic and seismic) in accordance with the applicable safety regulatory criteria. Minor deficiencies may exist that require remedial action and/or secondary studies or investigations.

POOR - A management unit safety deficiency is recognized for any required loading condition (static, hydrologic and seismic) in accordance with the applicable impoundment safety regulatory criteria. Remedial action is necessary. POOR also applies when further critical studies or investigations are needed to identify any potential impoundment safety deficiencies.

UNSATISFACTORY – The facility is considered unsafe. An impoundment safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary.

Condition Rating Criteria

In a system similar to the U.S. Department of Interior, Safety Evaluation of Existing Impoundments (SEED 1995), the terms "Satisfactory," "Fair," "Poor," and "Unsatisfactory" are used in a general sense when describing the structural condition and the operational adequacy of the equipment for a impoundment or reservoir and its appurtenant works during the visual assessment. In addition, the term "Unknown" may be utilized, as applicable.

Satisfactory – Expected to fulfill intended function.

Fair – Expected to fulfill intended function, but maintenance or other actions are recommended.

Poor – May not fulfill intended function; maintenance, repairs, or other actions are necessary.

Unsatisfactory – Is not expected to fulfill intended function; repair, replacement, or modification is necessary.

Unknown – Not visible, not accessible, not inspected, or unable to determine the condition rating based on the observation taken.

Copyright 2011 Kleinfelder West, Inc.

Recommendation Listing

Recommendations shall be written concisely and identify the specific actions to be taken. The first word in the recommendation should be an action word (i.e. “Prepare”, “Perform”, or ”Submit”). The recommendations shall be prioritized and numbered to provide easy reference. Impoundment Safety Recommendations shall be grouped, listed or categorized similar to the U.S. Department of Interior, Reclamation Manual - Directives and Standards - Review/Examination Program for High- and Significant-Hazard Impoundments (July, 1998 FAC 01-07) as follows:

Priority 1 Recommendations: Priority 1 Recommendations involve the correction of severe deficiencies where action is required to ensure the structural safety and operational integrity of a facility or that may threaten the safety of the impoundment.

Priority 2 Recommendations: Priority 2 Recommendations are where action is needed or required to prevent or reduce further damage or impaired operation of the facility and/or improve or enhance the O&M of the facility, which do not appear to threaten the safety of the impoundment.

Copyright 2011 Kleinfelder West, Inc.

SECTION 8 – LIMITATIONS

The scope of this work is for a preliminary screening for the EPA and plant owner/operator of the visible performance and apparent stability of the impoundment embankments based only on the observable surface features and information provided by the owner/operator. Other features below the ground surface may exist or may be obscured by vegetation, water, debris, or other features that could not be identified and reported. This site assessment and report were performed without the benefit of any soil drilling, sampling, or testing of the subsurface materials, calculations of capacities, quantities, or stability, or any other engineering analyses. The purpose of this assessment is to provide information to the EPA and the plant owner/operator about recommended actions and/or studies that need to be performed to document the stability and safety of the impoundments.

This work was performed by qualified personnel in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession, practicing in the same locality, under similar conditions, and at the date the services are provided. Kleinfelder's conclusions, opinions, and recommendations are based on a limited number of observations. It is possible that conditions could vary between or beyond the observations made. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided. Kleinfelder makes no warranty or guaranty of future embankment stability or safety.

This report may be used only by the client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance but in no event later than one (1) year from the date of the report.

The information, included on graphic representations in this report, has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, expressed or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. These documents are not intended for use as a land survey product nor are they designed or intended as a construction design document. The use or misuse of the information contained on these graphic representations is at the sole risk of the party using or misusing the information.

Recommendations contained in this report are based on preliminary field observations without the benefit of subsurface explorations, laboratory tests, or detailed knowledge of the existing construction. If the scope of the proposed recommendations changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid unless the changes are reviewed and the conclusions of this report are modified or approved in writing by Kleinfelder. Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field.

Copyright 2011 Kleinfelder West, Inc.

SECTION 9 – REFERENCES

- Google Inc. (2011). Google Earth Pro (Version 6.0.2.2074) [Software]. Available from http://www.google.com/earth/index.html

- KCP&L Montrose Generating Station Pond Assessment (CD), March 1 2011.

- Missouri Center for Applied Research and Environmental Systems (CARES), Missouri Soil Survey, 2011.

- New Jersey Department of Environmental Protection, Impoundment Safety Guidelines for the Inspection of Existing Impoundments, January 2008

- US Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Web Soil Survey – online

- US Department of Interior, Reclamation Manual – Directives and Standards – Review/Examination Program for High and Significant Hazard Impoundments, July 1998

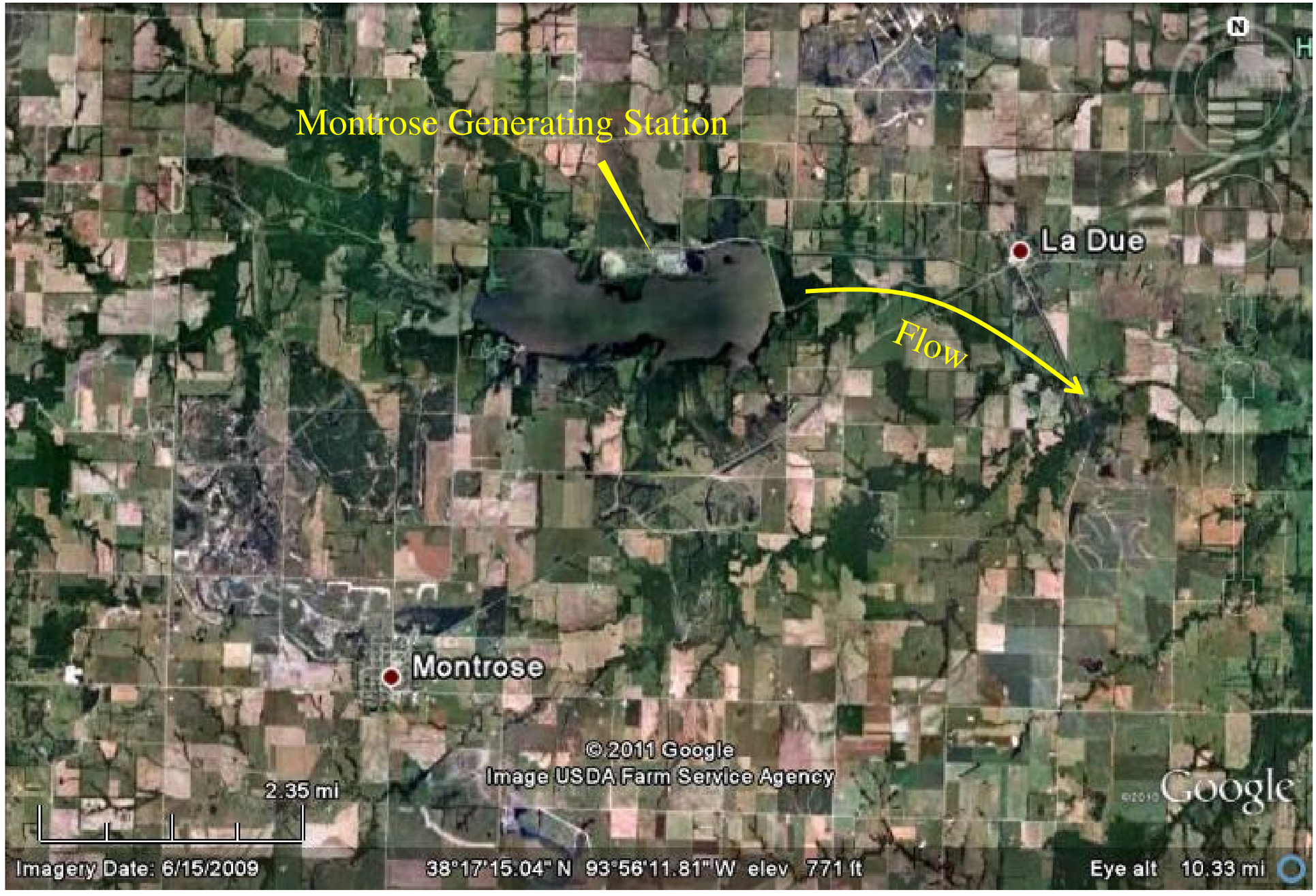
- US Department of the Interior, Safety and Evaluation of Existing Impoundments (SEED), 1995

- US Geologic Survey (USGS) "Design Maps" Detailed Report, 2009 NEHRP Recommended Seismic Provisions, Section 11.4.1 – Mapped Acceleration Parameters and Risk Coefficients, March 15, 2011.

Copyright 2011 Kleinfelder West, Inc.

Plates

Plate 1	Downstream Infrastructure Map
Plate 2	KCP&L Property Map
Plate 3	Aerial Site Location Map
Plate 4	Pond Area - Site Features Map
Plate 5	Pond Area - Photograph Location Map



N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

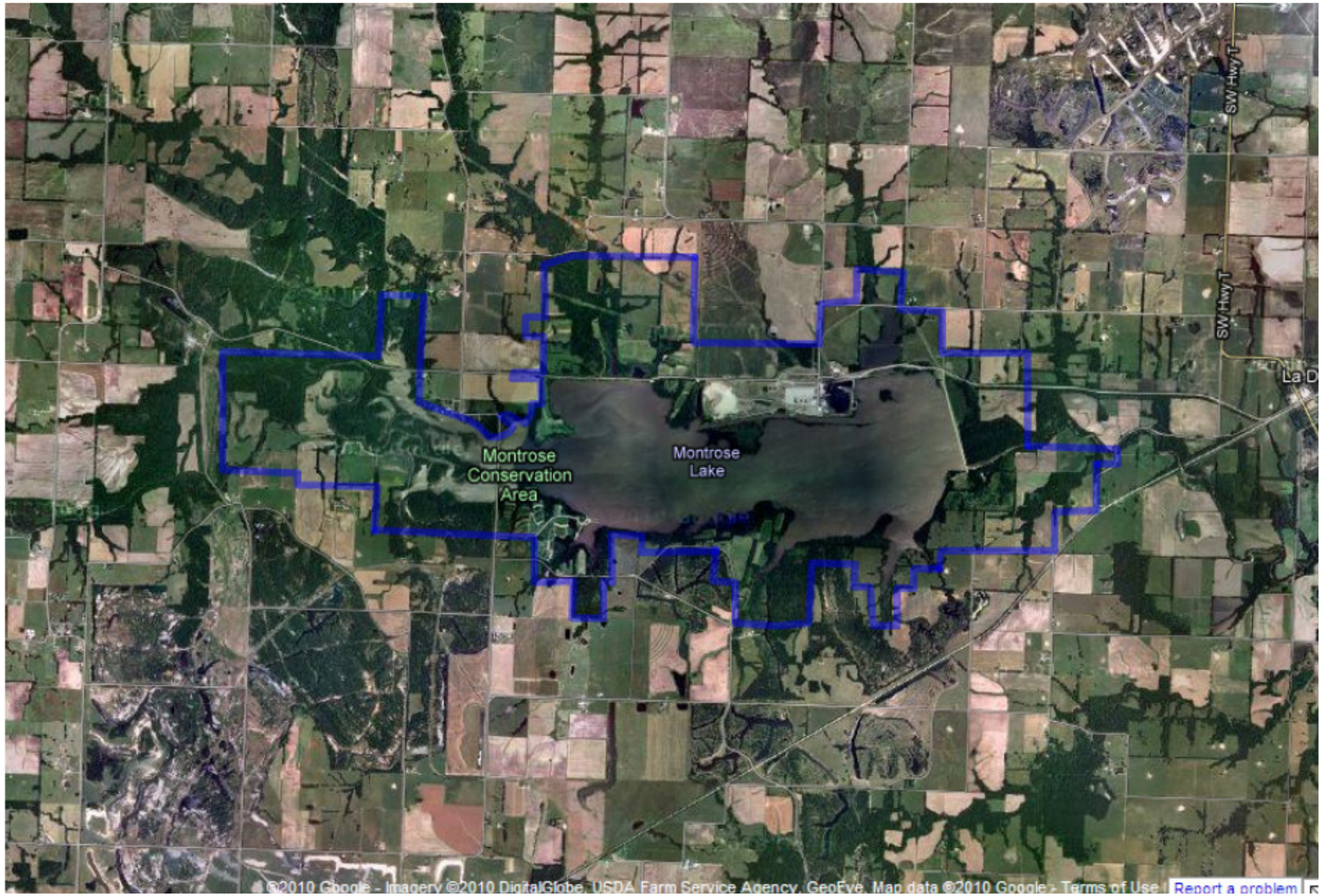
PROJECT NO.	116664-1
DATE:	9-30-11
DRAWN BY:	B. Piede
CHECKED BY:	J. Hoffman
FILE NAME:	Montrose Plates

DOWNSTREAM INFRASTRUCTURE MAP

MONTROSE GENERATING STATON
KANSAS CITY POWER & LIGHT
MONTROSE, MISSOURI

PLATE

1



N

Legend: KCP&L Property Line

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT NO.	116664-1
DATE:	9-30-11
DRAWN BY:	B. Piede
CHECKED BY:	J. Hoffman
FILE NAME:	Montrose Plates

KCP&L PROPERTY MAP

MONTROSE GENERATING STATON
KANSAS CITY POWER & LIGHT
MONTROSE, MISSOURI

PLATE

2

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT NO.	116664-1
DATE:	9-30-11
DRAWN BY:	B. Piede
CHECKED BY:	J. Hoffman
FILE NAME:	Montrose Plates

AERIAL SITE LOCATION MAP

MONTROSE GENERATING STATON
KANSAS CITY POWER & LIGHT
MONTROSE, MISSOURI

PLATE

3

N

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT NO.	116664-1
DATE:	9-30-11
DRAWN BY:	B. Piede
CHECKED BY:	J. Hoffman
FILE NAME:	Montrose Plates

POND AREA—SITE FEATURES MAP

MONTROSE GENERATING STATON
KANSAS CITY POWER & LIGHT
MONTROSE, MISSOURI

PLATE
4

N

Legend:

21 - Photo number, location, and direction

Notes: 1) Photographs 1, 2 and 39 through 44 were taken near the power generating plant and not shown on this map.
2) Photograph locations are approximate and may not coincide with the coordinates shown on the photo.

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT NO.	116664-1
DATE:	9-30-11
DRAWN BY:	B. Piede
CHECKED BY:	J. Hoffman
FILE NAME:	Montrose Plates

POND AREA—PHOTOGRAPH LOCATION MAP

MONTROSE GENERATING STATON
KANSAS CITY POWER & LIGHT
MONTROSE, MISSOURI

PLATE
5

Appendix A

Site Assessment Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Montrose Generating Station	Date:	03/01/11
Unit Name:	South Ash Pond	Operator's Name:	Kansas City Power & Light
Unit I.D.:	SPD-3	Hazard Potential Classification:	High Significant Low ✓ LESS THAN LOW
Inspector's Name:	Jeff Hoffman, Brad Piede		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	753.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	Variable		Is water exiting outlet, but not entering inlet?		N/A
6. If Instrumentation is present, are readings recorded (operator records)?		N/A	Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		N/A	From underdrain?		N/A
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?		N/A
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		N/A
11. Is there significant settlement along the crest?		✓	Over widespread areas?		N/A
12. Are decant trashracks clear and in place?		N/A	From downstream foundation area?		N/A
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?	✓		Around the outside of the decant pipe?		N/A
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		N/A	23. Water against downstream toe?		N/A
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

2. Operator records show approximate pool elevation at 753 feet. Pool elevation is variable depending on when dredging occurred.

5. Incised pond with top elevation as native ground. Approximate elevation of 756 feet. No survey data available.

6. No instrumentation present.

8. No construction documents available.

14. Western pipe (of 2) between the 2 South Ash Ponds was covered with vegetation.

* The South Ash Pond is an incised impoundment in natural ground, and was not built over wet ash, slag, or other unsuitable materials.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # MO-0101117 INSPECTOR Kleinfelder

Date 3/1/11

Impoundment Name Montrose Generating Station - South Ash Pond

Impoundment Company Kansas City Power & Light

EPA Region 7

State Agency (Field Office) Addresss 500 Northeast Colbern Rd.
Lee's Summit, MO 64086

Name of Impoundment South Ash Pond (consists of 2)

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Settling pond and temporary ash storage

Nearest Downstream Town : Name La Due, MO

Distance from the impoundment 3.2 miles

Impoundment Location:

Longitude 93 Degrees 56 Minutes 22.33 Seconds

Latitude 38 Degrees 18 Minutes 37.94 Seconds

State MO County Henry

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

__X__ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

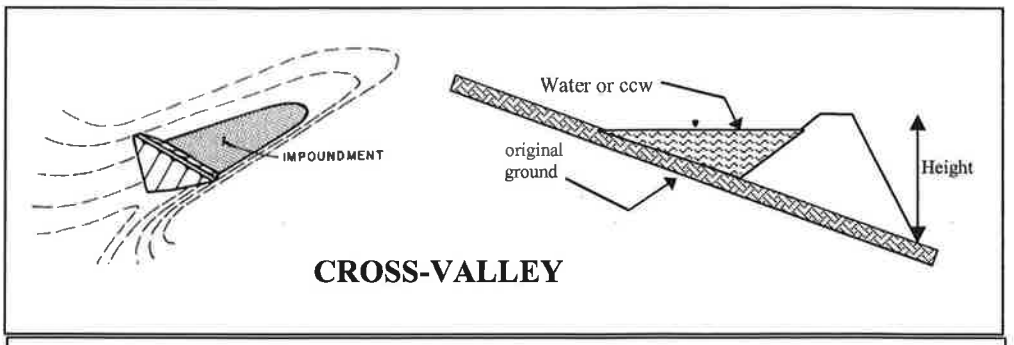
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

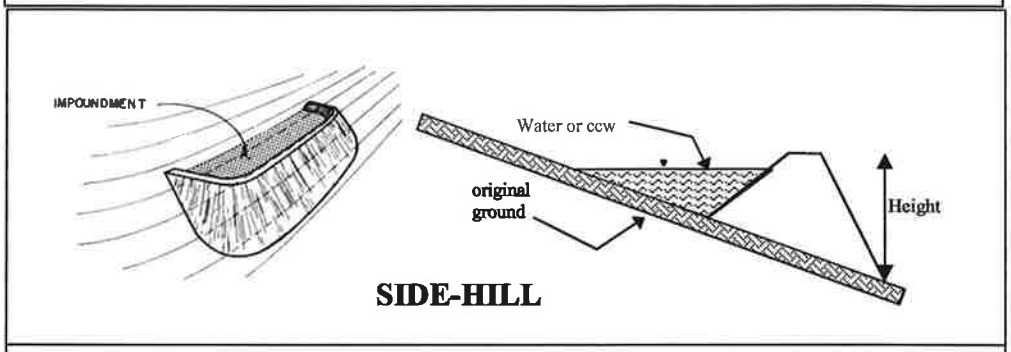
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

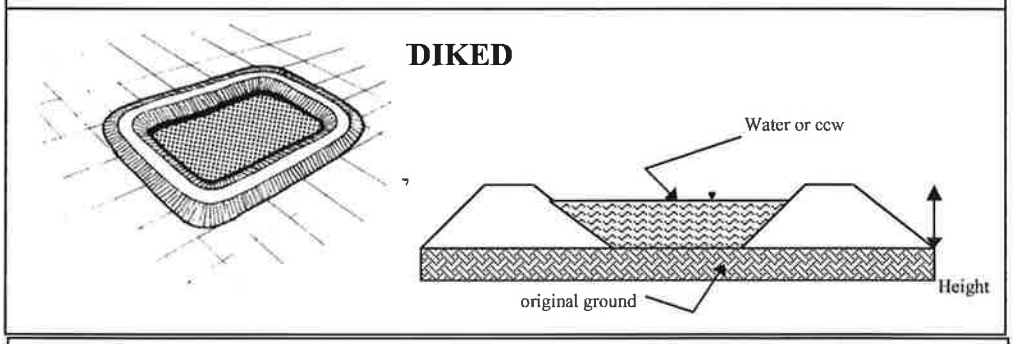
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

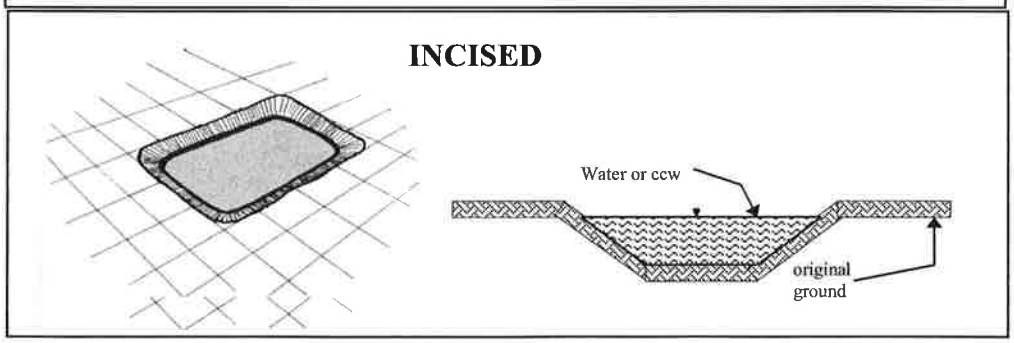
- Incised pond with native grades surrounding the area.
- No loss of human life anticipated
- Discharge would go to the KCP&L owned lake.
- Pond is a secondary settling pond with dewatering tanks used to remove larger sized material. Reduces amount of ash that would be discharged.
- Surrounding area is agricultural and failure would have a low economic impact.

CONFIGURATION:









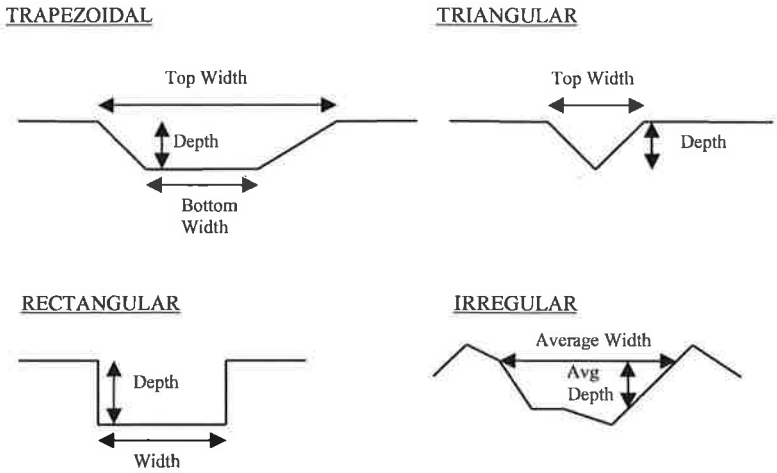
_____ Cross-Valley
_____ Side-Hill
_____ Diked
X Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height Variable feet Embankment Material Native Soil
Pool Area 2.7 acres Liner In Situ Clay
Current Freeboard 2-3 feet Liner Permeability N/A

TYPE OF OUTLET (Mark all that apply)

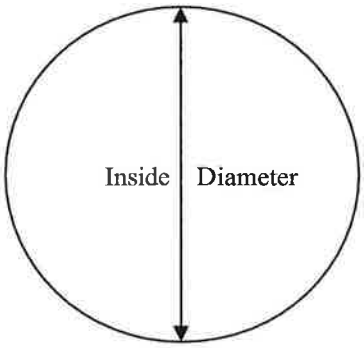
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width



_____ **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____

_____ **No Outlet**

X **Other Type of Outlet** (specify) 4' x 4' box - metal cover/top at inlet. Outlet was submerged and details are unknown.

The Impoundment was Designed By No design documentation

Has there ever been a failure at this site? YES _____ NO ___Y_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __Y____

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO Y

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Montrose Generating Station	Date:	03/01/11
Unit Name:	North Ash Pond	Operator's Name:	Kansas City Power & Light
Unit I.D.:	SPD-4	Hazard Potential Classification:	High Significant Low
Inspector's Name:	Jeff Hoffman, Brad Piede		✓ LESS THAN LOW

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Weekly		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	755.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		N/A
5. Lowest dam crest elevation (operator records)?	Variable		Is water exiting outlet, but not entering inlet?		N/A
6. If instrumentation is present, are readings recorded (operator records)?		N/A	Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		N/A	From underdrain?		N/A
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?		N/A
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		N/A
11. Is there significant settlement along the crest?		✓	Over widespread areas?		N/A
12. Are decant trashracks clear and in place?		N/A	From downstream foundation area?		N/A
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		N/A
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		N/A	23. Water against downstream toe?		N/A
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

2. Operator records show approximate pool elevation at 755 feet. Pool elevation is variable depending on when dredging occurred.

5. Incised pond with top elevation as native ground. Approximate elevation of 758 feet. No survey data available.

6. No instrumentation present.

8. No construction documents available.

19. Some minor erosion on outflow ditch.

21. Incised pond - No seepage observed in adjacent drainage ditch.

* North Ash Pond is an incised impoundment in natural ground, and not built on wet ash, slag, or other unsuitable materials

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # MO-0101117 INSPECTOR Kleinfelder

Date 3/1/11

Impoundment Name Montrose Generating Station - North Ash Pond

Impoundment Company Kansas City Power & Light

EPA Region 7

State Agency (Field Office) Addresss 500 Northeast Colbern Rd.
Lee's Summit, MO 64086

Name of Impoundment North Ash Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?		X

IMPOUNDMENT FUNCTION: Settling pond and temporary ash storage

Nearest Downstream Town : Name La Due, MO

Distance from the impoundment 3.2 miles

Impoundment Location:

Longitude 93 Degrees 56 Minutes 21.0 Seconds

Latitude 38 Degrees 18 Minutes 39.38 Seconds

State MO County Henry

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

__X__ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

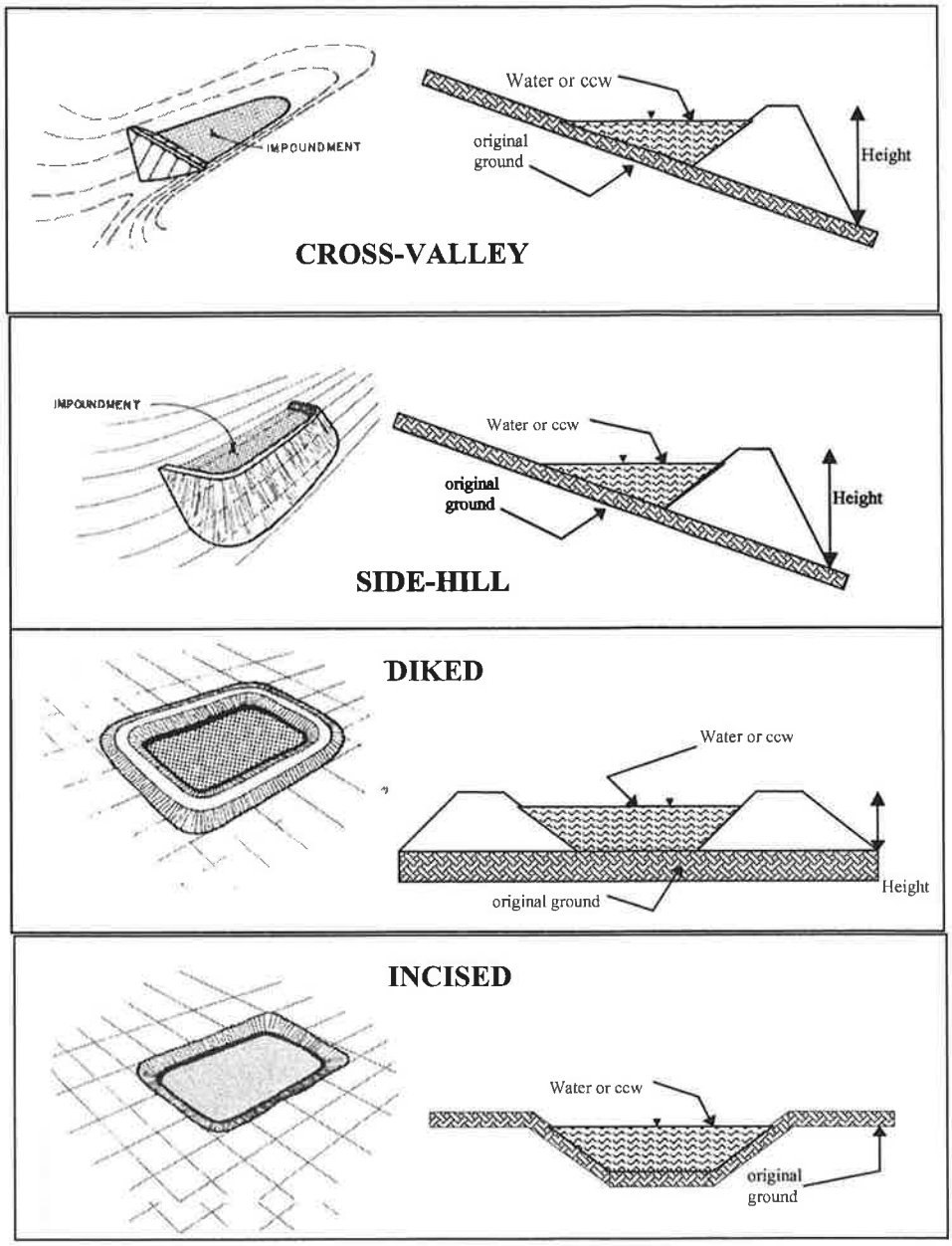
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

- Incised pond with native grades surrounding the area.
- No loss of human life anticipated.
- Discharge would go to KCP&L owned lake.
- Pond is a secondary settling pond with dewatering tanks used to remove larger sized material. Reduces amount of ash that would be discharged.
- Surrounding area is agricultural and failure would have a low economic impact.

CONFIGURATION:



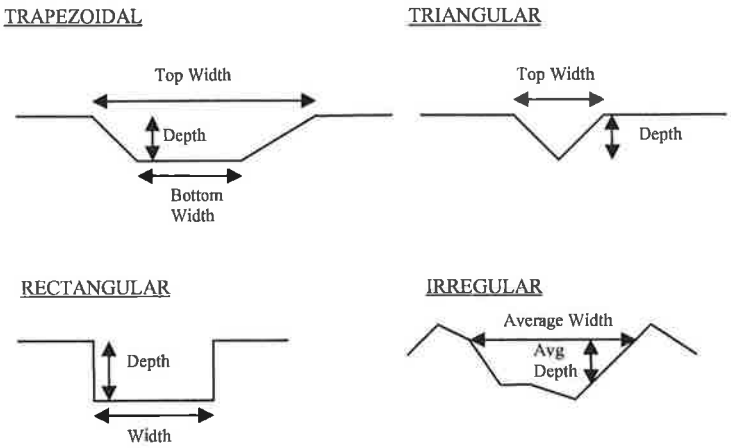
_____ Cross-Valley
_____ Side-Hill
_____ Diked
__X__ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __10__ feet Embankment Material __Native Ground__
Pool Area __1.65__ acres Liner __In Situ Clay__
Current Freeboard __approx 4__ feet Liner Permeability __N/A__

TYPE OF OUTLET (Mark all that apply)

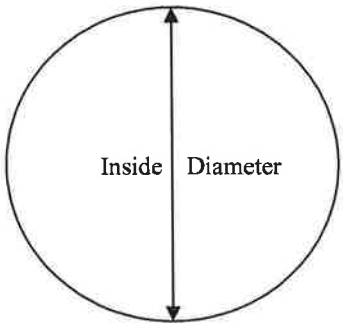
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

_____ depth
_____ bottom (or average) width
_____ top width



__x___ **Outlet**

24" inside diameter



Material
_____ corrugated metal
_____ welded steel
x concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO X - Not currently in service

_____ **No Outlet**

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By No design documentation

Has there ever been a failure at this site? YES _____ NO ___x_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __x____

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO X

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Additional questions To Ask While conducting Coal Ash Site assessments

The purpose of the following questions is to identify each part of the equipment sequence that handles fly ash, bottom ash, boiler slag, and Flue gas desulfurization sludges from the point of generation to the CCR impoundments or into "dry" disposal.

Ask the same 4 questions for fly ash, bottom ash, boiler slag, Flue gas desulfurization sludge:

FLY ASH

1. Exactly how is it generated at the boiler? Describe equipment used to initially collect it (steel box, etc).

   Coal is burned with fly ash collected on electrostatic precipitators, which then drop the ash into a steel hopper.

2. How is it moved from point of generation to storage? Describe each piece of equipment used to move it. Does this equipment have containment?

   From the hopper, the fly ash is pneumatically moved through pipes to fly ash silos. There is no containment equipment between the hopper and silos.

3. Describe the type of equipment is used to store it. Describe the engineering characteristics of each of these storage units (silos, tanks, size, construction type (steel). Does this equipment have containment?

   The fly ash is then stored and contained in one of three silos, with two silos constructed of glazed tile and the third constructed of steel. The silos are approximately 25 feet in diameter and 50 feet high.

4. How is it moved from storage to final disposal? Describe each piece of equipment Does this equipment have containment?

   Approximately 50 percent of the fly ash is used for beneficial purposes and hauled off-site through the use of pneumatic tanker trucks. The remaining fly ash is hauled to the on-site landfill by covered dump trucks. The ash is transferred from the silos to the tankers/dumps through a pipe at the bottom of the silo.

Bottom Ash

5. Exactly how is it generated at the boiler? Describe equipment used to initially collect it (steel box, etc).

   Coal is burned and the ash falls into a steel hopper.

6. How is it moved from point of generation to storage? Describe each piece of equipment used to move it. Does this equipment have containment?

   The bottom ash is then sluiced to a steel dewatering bin through carbon steel pipes. There is no containment between the hopper and the dewatering bin.

7. Describe the type of equipment is used to store it. Describe the engineering characteristics of each of these storage units (silos, tanks, size, construction type (steel). Does this equipment have containment?

   The steel dewatering bin allows the larger diameter particle to settle out, with water decanted and pumped to the ash ponds. The dewatering bins are approximately 25 feet in diameter and height.

8. How is it moved from storage to final disposal? Describe each piece of equipment Does this equipment have containment?

   Covered dump trucks remove bottom ash from the dewatering tank approximately once a week, with the ash transferred from the tank to the dump truck using a chute at the bottom of the dewatering tank. The bottom ash is then either hauled to the on-site landfill or hauled off-site for beneficial use. Ash that settles out in the ash ponds is dredged approximately once or twice a year and hauled to the on-site landfill.

Boiler Slag – NO BOILER SLAG

9. Exactly how is it generated at the boiler? Describe equipment used to initially collect it (steel box, etc).

N/A

10. How is it moved from point of generation to storage? Describe each piece of equipment used to move it. Does this equipment have containment?

N/A

11. Describe the type of equipment is used to store it. Describe the engineering characteristics of each of these storage units (silos, tanks, size, construction type (steel). Does this equipment have containment?

N/A

12. How is it moved from storage to final disposal? Describe each piece of equipment Does this equipment have containment?

    N/A

Flue Gas Desulfurization Sludge – NO FGD SLUDGE

13. Exactly how is it generated at the boiler? Describe equipment used to initially collect it (steel box, etc).

N/A

14. How is it moved from point of generation to storage? Describe each piece of equipment used to move it. Does this equipment have containment?

N/A

15. Describe the type of equipment is used to store it. Describe the engineering characteristics of each of these storage units (silos, tanks, size, construction type (steel). Does this equipment have containment?

N/A

16. How is it moved from storage to final disposal? Describe each piece of equipment Does this equipment have containment?

    N/A

Appendix B

Response Letter to the EPA's Section 104(e) Request for Information

May 15, 2009

Via Express Mail

Mr. Richard Kinch
US Environmental Protection Agency
Two Potomac Yard
2733 S. Crystal Dr.
5th Floor; N-5738
Arlington, VA 22202-2733

Re: Request for Information Under Section 104(e) of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. 9604(e)

Dear Mr. Kinch:

Enclosed is the response of Kansas City Power & Light Company (KCP&L) to EPA's Section 104 (e) request for information not dated that was received May 4, 2009 regarding an ash settling pond at KCP&L's Montrose Generating Station. The ash is periodically removed from the pond and beneficially used off-site or deposited in an on-site permitted landfill.

I certify that the information contained in this response to EPA's request for information and the accompanying documents is true, accurate, and complete. As to the identified portions of this response for which I cannot personally verify their accuracy, I certify under penalty of law that this response and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

If you have any questions regarding this response, please contact me at 660-885-2284.

Sincerely,

Gregory R. Lee

Gregory R. Lee
Plant Manager
Montrose Generating Station

Enclosure A

Enclosure A

Kansas City Power & Light Company **May 15, 2009**
Montrose Generating Station
Management Unit: Ash Settling Pond

Please provide the information requested below for each surface impoundment or similar diked or bermed management unit(s) or management units designated as landfills which receive liquid-borne material for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. This includes units that no longer receive coal combustion residues or by-products, but still contain free liquids.

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less-than-Low, please provide the potential hazard rating for each management unit and indicate who established the rating, what the basis of the rating is, and what federal or state agency regulates the unit(s). If the unit(s) does not have a rating, please note that fact.

The Management Unit does not have a known rating. The Missouri Department of Natural Resources - Solid Waste Management Program regulates solid waste facilities in Missouri.

2. What year was each management unit commissioned and expanded?

The Management Unit was commissioned approximately in 1958 and has not been expanded. The ash is periodically removed from the Management Unit and beneficially used off-site or deposited into an on-site permitted landfill.

3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash: (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).

Fly ash and bottom ash.

4. Was the management unit(s) designed by a Professional Engineer? Is or was the construction of the waste management unit(s) under the supervision of a Professional Engineer? Is inspection and monitoring of the safety of the waste management unit(s) under the supervision of a Professional Engineer?

The Management Unit was not designed by a known Professional Engineer nor was the construction of the Management Unit under the supervision of a known Professional Engineer. Inspection and monitoring of the safety of the Management Unit is not completed under the supervision of a Professional Engineer.

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the

management unit(s)? Briefly describe the credentials of those conducting the structural integrity assessments/evaluations. Identify actions taken or planned by facility personnel as a result of these assessments or evaluations. If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors. If the company plans an assessment or evaluation in the future, when is it expected to occur?

The Management Unit is visually inspected on approximately a weekly basis by operational or security personnel. There has been no known assessment or evaluation of the safety (i.e., structural integrity) of the Management Unit beyond the visual inspection. There have been no known actions taken or planned by facility personnel as a result of the visual inspections of the Management Unit. There are no planned assessments or evaluation of this Management Unit in the future beyond the visual inspections.

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department which conducted or is planning the inspection or evaluation. Please provide a copy of the most recent official inspection report or evaluation.

There have been no known State or Federal regulatory official inspection or evaluation of the safety (structural integrity) the Management Unit. We are not aware of a planned state or federal inspection or evaluation in the future.

7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

There have been no known assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year that uncovered a safety issue(s) with the Management Unit.

8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material currently stored in each of the management unit(s)? Please provide the date that the volume measurement(s) was taken. Please provide the maximum height of the management units(s). The basis for determining the maximum height is explained later in this Enclosure.

The Management Unit's surface area is approximately 4.4 acres and the total storage capacity is approximately 21,300 cubic yards. The capacity measurements were made as of 2009. The volume of material currently stored in the Management Unit is estimated today to be approximately 7,500 cubic yards. The Management Unit's Dam Height, pursuant to Enclosure A, is 6 feet.

9. Please provide a brief history of known spills or unpermitted releases from the unit within the

last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).

There have been no known spills or unpermitted releases from the Management Unit within the last ten years.

10. Please identify all current legal owner(s) and operator(s) at the facility.

The current legal owner of the Montrose Generating Station is Kansas City Power & Light Company. The current operator of Montrose Generating Station is Kansas City Power & Light Company.